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I am sometimes asked in which ways we, as a Zoological Society, contribute to wildlife conservation, and how our field conservation projects link to the animals at Bristol Zoo Gardens and the Wild Place Project.

To me, zoos fulfil three major conservation functions. The oldest one, dating back more than five decades, is cooperative conservation breeding of threatened species. Twenty years later, in the 1980s, zoos started to contribute directly to field conservation of species and their habitats, which has ever since constituted our second major conservation function. The third, and arguably most important conservation function of zoos, is engaging people with the natural world, teaching all levels of Society about the state of the world’s natural environments and promoting positive behaviour change towards more wildlife-friendly actions. Behaviour change and its evaluation have only recently become part of Bristol Zoological Society’s portfolio. We ran our first dedicated behaviour change campaign, on FSC-certified charcoal, in the summer of 2013.

Our choice of which species to prioritise in our conservation work has always been linked closely to our major zoo exhibits. We collaborate closely with the relevant Taxonomic Advisory Groups of the European Association of Zoos and Aquaria (EAZA), with breeding programme coordinators and studbook keepers as well as with the corresponding taxonomic and functional Specialist Groups of the International Union for Conservation of Nature’s (IUCN) Species Survival Commission to determine the conservation needs of the species in our care. A number of our staff serve on these Specialist Groups and contribute directly to conservation prioritisation for entire taxonomic groups, which in turn helps us decide where to invest our funds. We aim to carry out our conservation interventions as part of international or national action plans mandated by the IUCN and/or the governments of the respective habitat countries. Examples are the IUCN Lemur Conservation Strategy 2013–2016 that the Society lead-authored, the South African government’s Biodiversity Management Plan for the African penguin that mandates the Society to carry out its ‘Chick Bolstering Project’, and the recent Amphibian Action Plan for the Sahamalaza Peninsula, northwest Madagascar.

The evaluation of species conservation interventions is notoriously difficult, as effects often only show over the medium to long term and are not easily measurable. For example, determining increases in population size of a long-lived species, such as primates, is virtually impossible over a normal three-year grant cycle as changes in population size of such species may take decades to become noticeable. Our integrated, holistic and multi-layered approach to conservation further complicates evaluation. We are currently working with a number of colleagues from other BIAZA collections to develop a framework for determining the success of biodiversity conservation projects.

Our own approach is to develop elaborate ‘Theories of Change’ for each of our projects, which in turn help us define Key Ecological Attributes that we can measure and report. In addition to outcomes and outputs, we measure our financial conservation input annually, using the methodology developed by the EAZA Conservation Committee. In 2015, 15.5% of the Society’s turnover (about £1.48m) was spent on conservation as per the EAZA definition. Field and zoo-based conservation does not constitute our total charitable expenditure, but is becoming a more and more significant part of it. In 2015, our conservation and science work has again encompassed many different projects in various parts of the world and here at home in the South-West of England, and I hope you will be enthused by this report on what we have been up to!

Christoph Schwitzer
Director of Conservation Bristol Zoological Society
New Library in the Institute of Conservation Science and Learning

In early 2015, after 10 years of being Simon Garrett’s (Head of Learning) and Christoph Schwitzer’s (Director of Conservation) dream, the library has finally been created within the new Institute of Conservation Science and Learning’s Conservation Education Centre.

This library collection is composed of books, periodicals and magazines contributed by members of staff from the Zoo over many years. The library is open to students, staff, volunteers and even the public on prior request. It is one of the few zoo libraries in the UK. This is an incredible place to study where you can find specific resources about animals and conservation. The library is only one-year-old, and will grow over the time.

7th Annual BZS Symposium – Human–Wildlife Interactions

In February 2015, the 7th Annual BZS Symposium focused on human-wildlife interactions and was a sell out! Following a welcome by Bryan Carroll, 12 presentations were given under the theme ‘Saving Wildlife Together: conflict, co-existence and conservation’. These included talks from zoo staff, Neil Maddison (Conservation Field Programmes), Eddie Mole/ Emma Moore (Gardens Team) and Simon Garrett (Conservation Learning), in addition to external speakers. The presentations spanned a broad range of topics from the role of Anthropology in conservation and managing large carnivores in human-dominated environments, to exploring ways of engaging people at sites of conservation interest and through the media. External speakers included Dr Jo Setchell (Durham University), Dr Laurie Marker (Cheetah Conservation Fund), Professor Stephen Emmott (Computational Science, Microsoft) and Paul Williams (BBC NHU). The Symposium took place in the Pavilion but, for the first time, a drinks reception was held in the newly finished Conservation Education Centre. This enabled the discussions to continue and tours to take place of our new facilities. This was a great way to conclude an interesting and stimulating day with staff, external guests and students!
BZS Coordinates IUCN Workshops on Primate Red Listing

In 2015 Christoph Schwitzer and Alison Cotton from the conservation science team coordinated two workshops that updated the International Union for Conservation of Nature (IUCN)’s Red List of Threatened Primate Species. Neotropical primates were assessed by the IUCN SSC Primate Specialist Groups in a workshop in January at Houston Zoo, USA, while Asian taxa were assessed at Singapore Zoo in November.

Publication of “Primates in Peril”

The IUCN Red List is not only the most comprehensive repository of species’ conservation statuses in the world, it is also a hugely valuable and well utilised tool for assessing conservation priorities across the globe. 2015 also saw the publication of “Primates in Peril: the world’s 25 most endangered primates 2014-2016”, edited by Christoph Schwitzer and Alison Cotton et al., which highlighted the most threatened primates in Africa, Madagascar, Asia and the Neotropics. Dr Schwitzer, BZS’s Director of Conservation, is the Vice-Chairman of the IUCN Primate Specialist Group, responsible for primates in Madagascar, as well as being the Red List Authority Coordinator responsible for designation of all primates on the list.
IUCN Save Our Species (SOS) Fund for Lemurs

Launched in 2015, this special fund is dedicated to the conservation of lemurs by providing funds to projects outlined in the Lemur Action Plan 2013-2016. This plan identifies 30 priority sites for conservation action together with recommended actions for site specific work to save Madagascar’s lemurs from extinction while addressing the needs of communities who also depend on the species’ long-term survival. It was written by members of the IUCN Species Survival Commission’s Primate Specialist Group and published in 2014. SOS Lemurs harnesses the aggregating potential of the SOS model: pooling funds from donors and disbursing them in the form of small to medium size grants to existing Madagascar-based conservation actors while applying world class project management to ensure every conservation dollar is used to its potential. BZS Madagascar Project was a recipient of the fund this year for our long-term project on the conservation of blue-eyed black lemurs (*Eulemur flavifrons*) in Sahamalaza.

New Stick Insects!

In November BZS joined an international effort to save one of the world’s rarest insects. The Lord Howe Island stick insect is a Critically Endangered species, and 300 eggs were flown over from Melbourne Zoo to set up a new captive breeding program to prevent this species from becoming extinct. In a prelude to next year’s review, they began hatching successfully in January 2016!
Bristol Zoological Society delivered a number of undergraduate and postgraduate degrees in 2015, in partnership with the University of Bristol, the University of the West of England, the University of Gloucestershire and South Gloucestershire and Stroud College. Over 250 students were taught on site in 2015 by our conservation science, conservation learning and conservation medical staff.

**Undergraduate Degrees**

**Foundation Degree in Zoological Management**

Partners: University of Gloucestershire and South Gloucestershire and Stroud College

FdSc Zoological Management is a new course for 2015 that has been designed specifically to develop student's knowledge of the health, welfare and husbandry needs of species held within animal collections. It equips graduates with the practical skills required for a career in zoological management. The course takes a holistic approach to the study of animal management and is underpinned by a sound understanding of relevant biological principles and the procedures and legislation related to housing and breeding captive animals. The programme introduces methods of rehabilitating animals that are damaged psychologically and/or physically, and encourages students to critically assess captive environments and identify areas for improvement, based on behaviour and welfare needs. This two-year Foundation Science Degree is delivered entirely at Bristol Zoo Gardens. The intake in September 2015 was 14 students.

**Foundation Degree in Integrated Wildlife Conservation**

Partners: University of the West of England and South Gloucestershire and Stroud College

FdSc Integrated Wildlife Conservation (IWC) has been running since 2010. This programme adopts a biological approach to the study of wildlife conservation issues, developing a scientific understanding of our relationship with, and impact on, wildlife. Appealing to students attracted to a career in conservation who may not have considered a university education, the Foundation degree provides a recognised qualification in wildlife conservation after two years and provides a direct route to Level 3 of BSc (Hons) Integrated Wildlife Conservation at UWE. Students are taught on site at BZS for the two-year programme. Twenty-four students enrolled in year one of this course, and 14 students undertook their second year in 2015.

First year FdSc IWC students working in the Conservation Education Centre’s laboratory
BSc (Hons) Wildlife Ecology and Conservation Science

Partner: University of the West of England

Tackling the effects of environmental change and avoiding the mass extinction of species are enormous global challenges. Designed for biologists and ecologists with specific interests in species and habitat conservation, this degree equips students with the scientific knowledge and skills to understand the nature of global biodiversity, the effects of climate change, and current and novel scientific approaches to conserving wildlife. Conservation science staff lead three modules – Wildlife and Society (first year), Conservation in Practice (second year) and Primate Ecology and Conservation (third year), along with research project supervision of third year students. First and second year intakes in September 2015 were 35 and 55 students, respectively, and 28 students enrolled for the Primate Ecology and Conservation module in 2015.

Postgraduate Degrees

MSc Global Wildlife Health and Conservation

Partner: University of Bristol

This innovative programme aims to give students the knowledge, skills and practical training needed to work with wildlife, with special emphasis on its health and conservation at the global scale. Cutting-edge topics include animal capture and handling techniques, the assessment, stabilisation and transport of injured animals, methods for improving the welfare of captive animals, concepts in behavioural ecology, conservation breeding programmes, the reintroduction of captive populations to the wild, post-release monitoring, practical field-based conservation strategies and the management of protected areas. The curriculum also delivers a comprehensive introduction to wildlife disease ecology, surveillance and control. In addition to the two modules run by the BZS veterinary team, we run a variety of workshops and practical sessions on this degree. Twenty seven students graduated in 2015 and 30 students are enrolled for the 2015/2016 academic year.
During the 2014/15 academic year the Conservation Science Department supervised 19 third year BSc projects, 13 MSc students from Global Wildlife Health and Conservation and one sandwich placement student. Some of these projects are highlighted below.

**Enrichment and Welfare Research**

The zoo provides many of its animals with innovative and challenging enrichment on a regular basis. A key element of this enrichment is the scientific evaluation of how successful it is in improving the welfare of the animal. We undertake a number of different projects designed to evaluate new or existing enrichment and provide our results as valuable feedback to the keepers. For example, in 2015 we compared puzzle feeder devices to regular enrichment provided for kea and found that the former were more successful at providing greater levels of cognitive enrichment. We also demonstrated that enrichment and husbandry techniques can reduce aggressive behaviour between giraffe-nosed catfish.

**Behaviour Research**

Animal personality studies increase our understanding of the implications for individual behavioral differences in the management, welfare, and health of individuals. Results from a study of the captive wolf pack at the Wild Place Project found that key behavioural characteristics helped to differentiate the personality profiles of the individual wolves studied.

**Human–Wildlife Interactions**

People and wildlife are increasingly living at close proximity, and this can result in interactions that range from benign to mutually beneficial to those traditionally termed ‘conflicts’. We are interested in all elements of these interactions (physical and virtual) as this can impact on the success of conservation initiatives. For example, in 2015 we examined farmers’ attitudes and perceptions to red kites in mid-Wales. Although attitudes towards red kites were generally positive, this study did reveal the potential for the emergence of conflict situations from the farmers’ perspectives. This highlights the need for assessment of human wildlife interactions to mitigate any problems that may impede conservation progress.
Ex-situ conservation of the pancake tortoise (*Malacochersus tornieri*) – Genetic characterisation of confiscated individuals and captive breeding populations

The pancake tortoise (*Malacochersus tornieri*) has experienced major population declines due to heavy exploitation for the exotic pet trade. Populations are also threatened by agricultural practices and livestock grazing throughout their range, in Kenya, Tanzania and Zambia. It is classified as Vulnerable on the IUCN Red List. At present, many pancake tortoises in captivity are animals confiscated at customs; thus, information regarding their geographical origin and the level of genetic diversity or relatedness between individuals is missing. Examining the genetics of captive populations is necessary to be able to better manage their breeding program, led by Bristol Zoological Society. This is a collaborative project between BZS and the University of the West of England (UWE).

To date, our work has confirmed that good quality DNA samples can be collected using swabs of saliva from the tortoises. Confirmation of the success of this non-invasive collection technique has facilitated the collection of many more samples from other captive individuals across the UK and Europe. These can be now used in pedigree analysis for the selection of the best individuals in the breeding of pancake tortoises. It is also the first step in creating a rapid identification method for determining where animals confiscated by customs have originated, possibly allowing their release back into the wild. This project is funded by the British Chelonia Group.
EX−SITU CONSERVATION
SCIENCE RESEARCH

Introduction of a new gorilla into the BZS captive group

In September 2015, Touni arrived from the Vallee des Singes, France, as a new potential breeding female for our silverback, Jock. The BZS gorilla family is important to the breeding programme as their genes are under-represented, so giving Jock another female will give him more opportunity to breed and improve the genetic make-up of the captive population.

As the addition of a new group member can be a stressful time for all involved (gorillas and staff), we wanted to closely monitor the introduction and collect behavioural data on the group. These data would be used make decisions about the process of introduction, but also will be analysed and published so that they may be useful to other zoos undergoing female introductions in other gorilla groups.

There are two main ways to introduce a new female to an existing family. The first is to introduce her to the females one at a time, in order to build support networks for when she meets the silverback. Our approach was to introduce her to the silverback first. By doing this fairly soon after she arrived, Jock did not get frustrated by not having access to Touni, and he was able to maintain control over his group at all times. Jock takes his role as boss very seriously, and we felt he would get frustrated if others met the new arrival before him.

There were a few setbacks observed, mainly caused by Jock’s nine-year-old son Komale, who took the opportunity to try and take Touni for himself. In addition, the lowest ranked female, Kera, took an instant dislike to Touni and initiated aggression towards her on several occasions. Within a few months, however, our observations indicated that levels of aggressive behaviour had returned to pre-introduction levels as the group had begun to settle down. This research is critical to ensure we are carrying out introductions in the best manner possible for the health and welfare of our animals.
Dr Gráinne McCabe

Dr Gráinne McCabe is a biological anthropologist specialising in primate behaviour and ecology. Her research focuses on the reproductive ecology of wild monkeys in both Costa Rica and Tanzania using an integrative approach combining behavioural, ecological, nutritional, endocrinological and parasitological data to gain a better understanding of the factors impacting reproduction in threatened primates. Gráinne received her Ph.D. from the University of Texas at San Antonio in the United States and her Masters from the University of Calgary, Canada, in Primatology. Prior to her work at the Bristol Zoological Society, Gráinne was a joint Postdoctoral Research Fellow with Drexel University (USA) and Universidad Nacional de Guinea Ecuatorial, on Bioko Island in Equatorial Guinea, West Africa, where her work focused on primate conservation and attempting to halt the bushmeat trade by lobbying the government, microm credit projects to promote alternative sources of income and educating American and Equatom Guinean university students. In her role as Head of Conservation Science, Gráinne oversees the Society's international research projects and directs our higher education provision, in association with our partner universities. Gráinne has been with the BZS since September 2014.

Katie Major (BSc MSc)

Katie’s interest in human psychology and wildlife conservation first developed during her BSc Psychology degree at Plymouth University, and she completed an MSc in Primate Conservation at Oxford Brookes University to develop these interests further. During this time, she conducted research examining the behaviour and welfare of various captive species in both zoos and aquariums, including fish and lemurs. After completing her MSc, Katie spent eight months living in remote forests of the Philippines working with the Agta, an indigenous hunter-gatherer population. During this fieldwork she examined the knowledge and perceptions the Agta had of the protected area they lived in and their relationship with the wildlife around them, as well as working as a field assistant collecting genealogical information and behavioural data. Katie joined Bristol Zoological Society in spring 2015 and is responsible for designing, implementing and evaluating behaviour change campaigns (encouraging the public to perform pro-environmental behaviours) at Bristol Zoo Gardens and Wild Place Project, as well as teaching on the UWE FdSc Integrated Wildlife Conservation course. Her main research interests are applying psychology to promote pro-environmental behaviour, specifically in regards to behaviour change, and the role that indigenous people have in co-managing protected areas as well as their knowledge of the environment around them and their rights.
Lecturers in Conservation Science

Dr Tim Bray

Tim applies genetic approaches to a wide range of species and systems in order to unravel the way that extant diversity is generated and the mechanisms maintaining it. He began using molecular approaches during an MSc in Ecology and went on to look at demographic modelling during his PhD. At the finest scale his research has considered the genetics of populations in contexts as wide ranging as the historical gene-flow between populations, mating systems of rodents, and population cycling in moths. In the broader context his work has included a range of small mammal phylogeography, the recovery of shorebird populations, and investigating speciation in tropical beetles. Tim contributes to degree courses from Foundation to Masters level. In the capacity of supervisor he covers all levels of university students on subjects from animal behaviour to the ecology of species in the wild. Tim is also conducting his own research, with aspirations to expand his invertebrate and reptile interests.

Dr Fay Clark

Fay joined BZS after completing her PhD on the cognition and welfare of chimpanzees and dolphins, with the Royal Veterinary College and Zoological Society of London. Before this, Fay achieved an MSc from RVC/ZSL in Wild Animal Biology, and an MPhil in Biological Anthropology from the University of Cambridge. Fay has been undertaking zoo and aquarium research across the UK and North America since 2001, in addition to voluntary fieldwork on wild primates in Southern Africa. Her research thus far has focused on primates and cetaceans, taking insights from human psychology and evolution. Currently, she is extending her PhD research to other taxa, incorporating modern technology into enrichment, and validating novel indicators of welfare. As well as undertaking original research, Fay teaches and supervises students from Foundation to Masters level, in a wide range of topics including captive animal management, welfare, enrichment, project design and statistical techniques.

Dr Alison Cotton

Alison’s interest in animal behaviour and conservation quickly became apparent in her Bachelor degree which she did in her home country of New Zealand. After finishing her degree, Alison volunteered in Central and South America, as well as Indonesia, at rescue and rehabilitation centres and gaining insights into global conservation and wildlife issues. After returning to New Zealand she worked with the Department of Conservation, investigating the efficacy of the Kiwi Aversion Training that is done to deter dogs from killing kiwi across the country. In 2008 she moved to the UK to do her MSc at Oxford University where a new love of evolutionary research was born. A Masters by Research and PhD at UCL followed, examining the evolution of sexually selected traits in stalk-eyed flies. This involved behaviour and genetic experiments, both in the laboratory and in the rainforests of Malaysia. Alison joined BZS in July 2014. She teaches on the UWE FdSc Integrated Wildlife Conservation course as well as the UWE undergraduate Wildlife Ecology and Conservation Science degree. Alison also supervises BSc and MSc students from UWE and the University of Bristol with her main interests (outside of sexual selection and genetics) being based in animal behaviour, welfare and enrichment. Alison is also assisting Christoph with primate Red List assessments as well as editing the journal Lemur News.
Osiris Doumbé (MRes, MSc)

Osiris has always been interested in the African wildlife, but he decided to specialize in primates after a field experience at La Vallée des Singes, France, during his Biology degree. He obtained his MSc in Tropical Ecology from l'Université des Antilles et de la Guyane (Guadeloupe, French Indies) and his MRes in Primate Biology, Behaviour and Conservation from Roehampton University (London). For the latter, he studied the nesting behaviour of Nigeria-Cameroon chimpanzees in a fragmented forest of Cameroon. The following year, he went back to Africa as the Principal investigator of the Ellioti Project, a regional survey on the distribution of chimpanzees and the diversity of monkeys of the understudied North-West region of Cameroon. Since the completion of the Ellioti Project, he is a Lecturer in Conservation Science at Bristol Zoological Society. Osiris’s main research interests are conservation, ecology, and primate behaviour. He is currently involved in two projects in Cameroon: one on the primates of the Kom forest (North-West region) and another on the ecology of giraffes in Benoue National Park (North region).

Dr Sue Dow

Sue trained as a Zoologist at the University of Oxford and carried out a PhD at the University of Exeter on foraging and learning in pigeons. She has carried out research in Bristol on the biomechanics of bird flight and carried out investigations into tendon injuries and humane treatments for horses. She held a part-time post at London Zoo where she set up a pilot environmental enrichment programme. She has worked at Bristol Zoological Society since 1992 combining working on building projects and co-ordinating research projects carried out in the zoo. Sue’s main research interests are in animal behaviour, the effects of enclosure design on the behavioural repertoire of captive animals, and environmental enrichment as a husbandry technique. She maintains an interest in optimal foraging and food selection, particularly in birds, in captive and semi-natural situations. In addition, she is carrying out a longitudinal study of gorilla social dynamics at Bristol Zoo Gardens.

Daphne Kerhoas (PhD Candidate, MSc)

After focusing on Ethology throughout her Biology degree in France, Daphne studied in an Animal Behaviour programme in the USA, where she first experienced observing primates. Upon the completion of her Bachelor degree, she worked as a field scientist in Costa Rica, recording social behaviour in wild capuchins for a year. Following this experience, she went on to complete her Master degree on Animal Behaviour in Paris. The following year, she went to Nigeria for six months, recording vocalisations and social interactions in wild olive baboons, in collaboration with Roehampton University. Since January 2008, Daphne has been a PhD candidate at the Max Planck Institute for Evolutionary Anthropology, in collaboration with the German Primate Centre. She spent 2 years in the forest of Indonesia collecting behavioural data, vocalisation, and genetic samples of wild crested macaques to research male-infant relationships. Throughout these experiences, Daphne has been directly involved in a variety of conservation issues and motivated conservation actions, including environmental education, patrolling against poachers and illegal loggers, and dialogs with government representatives. Daphne is now working at Bristol Zoological Society and her main research interest is primates’ ecology and behaviour, animal social interactions and how they are affected by their environment.
**Lecturers in Conservation Science**

**Dr Amanda Webber**

After working in West Africa and Costa Rica, Amanda completed an MSc in Primate Conservation and a PhD in Anthropology at Oxford Brookes University. Her thesis focussed on human-wildlife interactions, specifically crop raiding by primates and other large vertebrates in northwest Uganda. Amanda joined Bristol Zoological Society in the summer of 2013 and she currently teaches on the UWE Wildlife Ecology and Conservation Science course (Wildlife & Society) and the UWE MSc programme Advanced Wildlife Conservation in Practice (Communication for Conservation). Amanda also supervises undergraduates and MSc students and her main research interests are human-wildlife interactions, perceptions of ‘pest’ species, and animals more generally, and wildlife conservation. She is currently developing several projects in Madagascar examining ibis conservation, ethnobotany, and agriculture.

**Postdoctoral Research Associate**

**Dr Richard Sherley**

Richard obtained his PhD in 2010 working in the interdisciplinary research group COMBINE at the University of Bristol (UK). The thesis analysed aspects of the population demography, biology and behaviour of two endemic seabird species in the Benguela Upwelling Ecosystem, the African Penguin and the Bank Cormorant. A major component of the work involved developing, and demonstrating the effectiveness of, an intelligent, visual surveillance system that could be integrated into a colony of African Penguins as a non-intrusive means of providing detailed and reliable data on the species. Since January 2011, Richard been working as a postdoctoral research associate at BZS and the Animal Demography Unit (ADU) and the Marine Research Institute. This work focuses on growth, recruitment, survival and movements of fledgling African Penguins in relation to prey availability. The principal aim of the research is to guide conservation management strategies by providing demographic and behavioural data to augment the current Ecosystem Approach to Fisheries efficacy tool used in fisheries management in South Africa.

**Librarian, Archivist and Administrator**

**Laetitia Delaleuf (MSc)**

Laetitia received her MSc in Science of Information and Library Science from the Ecole Nationale Superieure des Sciences de l'Information et des Bibliothèques and her History degree from the University of Poitiers. Before coming to BZS, Laetitia was a librarian in a public library in Lyon where she investigated the concept of using libraries for recreation by incorporating digital media such as social media, tablets and video games as learning tools. Laetitia is passionate about promoting information literacy skills, as well as fostering an attitude of learning and reading for pleasure. She is convinced that everyone needs to become critical information consumers, and believes that the librarian should be in the heart of this learning, providing both an informal and formal means to achieve it. Laetitia is also the zoo archivist. By working on the archive project at the zoo, she is bringing the zoo’s rich past to life for the public.
IN-SITU CONSERVATION: EXECUTIVE SUMMARY

A consistent pattern is emerging for most of our fieldwork, and 2015 saw this pattern continue. We have built up an expertise in supporting the conservation of wildlife in protected areas, reserves and the creation of these areas, through working with people living in or around them.

Our features on Cameroon, Colombia and the Philippines give more detail on these projects, but in all three we are working to support local communities in their move from ‘unsustainable development’ to new ways of living that both support their livelihoods and take the pressure off threatened wildlife. In the Philippines, we have created new protected areas under local laws, in Colombia we are supporting the Parks Department to create the first National Park in the central Magdalena Valley, and in Cameroon we have continued in our work with local people living alongside the Dja Biosphere Reserve, a World Heritage Site in the Congo Basin.

Elsewhere we co-chaired the first ever national symposium in China on the Pere David deer, where we have help set up and manage the Hubei Shishou Milu National Nature Reserve, in the Yangtze River Basin. This reintroduction project has been instrumental in establishing the Pere David deer back into an area where it was extirpated many years ago as a result of over-hunting. The deer is still officially redlisted by the IUCN as ‘EX – Extinct in the Wild’, and we hope that wild populations will be sufficiently established to ‘downgrade’ this listing in the near future.

We are also pushing forward with our strategy to safeguard giraffe in the wild. In 2015 we undertook a scoping study to north Cameroon. Now we are pulling together information and connecting with other stakeholders in order to devise a strategy for the conservation of giraffe in Cameroon in 2016. Our strategy will, once again, be based on how we can help local people to take the pressure off protected areas that contain some of the last remaining populations of giraffe in Cameroon.

Our UK Conservation Department has a strong focus on reintroduction and habitat restoration that runs alongside our annual commitments of monitoring our on-site native species and raising public awareness. During 2015, our regional toad patrols helped to save thousands of amphibians in their annual return to ancestral ponds. We cleared over 40km of Bristol riverbanks of invasive plant species. More than 1,000 endangered white-clawed crayfish were hatched, with over 240 being released into the wild. Our Avon Gorge surveys for the silky wave moth continued, with moth numbers higher than in the previous two years. The rare plant conservation programme continued with the propagation of the rare Adders Tongue Spearwort, which will be reintroduced into Gloucestershire as part of a habitat restoration programme. Our annual species monitoring surveys continued at both the Wild Place Project and Bristol Zoo, and our badger vaccination programme helped to protect our rare hoof stock against Tuberculosis. Running alongside our practical field work we also held over 60 training events and 40 public awareness raising events.

Neil Maddison
Head of Conservation Programmes
Bristol Zoological Society
IN–SITU CONSERVATION PROJECTS OVERVIEW

Bristol Zoological Society carries out field conservation programmes in five continents across the world and research programmes both in the field and right here at Bristol Zoological Society, Bristol Zoo Gardens and the Wild Place Project.

Our mission is to identify and implement sustainable solutions to species and ecosystem conservation challenges through research, action and local collaboration.

Our field programmes are each linked to exhibit areas in Bristol Zoo Gardens and the Wild Place Project, such as the brown spider monkey in Monkey Jungle, lemurs in the Madagascan village at the Wild Place Project, and African penguins in Seal and Penguin Coasts.

Central to the approach of all our in-situ conservation programmes is the ‘theory of change’ model.

“The theory of change approach is a process of project planning and evaluation which maps the relationship between a long-term goal of a project and the intermediate and early changes that are required to bring it about.”


The theory of change approach supports planning and evaluation of large-scale community change projects such as those seen in our work with the people of the Dja Biosphere Reserve in Cameroon. These community-based change initiatives often have ambitious goals and complex sets of interventions. The theory of change model helps us to balance multiple objectives, understand relationships between different objectives and interventions, and deal with the time lags required to observe ecological and social change.
What are Negros Bleeding Heart Doves?

Our flagship species is the Negros bleeding heart dove (*Gallicolumba keayii*), endemic to the Philippines. One of the most endangered birds in the world, it has an estimated global population of fewer than 400 wild birds. This species prefers dense closed-canopy forests, and has a severely fragmented population that is likely to be undergoing a continuing decline owing to forest loss. One of the places it does remain is in the Cuernos de Negros, in the southern part of the Oriental province of Negros island. It is there that we have focused our efforts to conserve this rare ground dwelling bird.
SPOTLIGHT: THE PHILIPPINES

What are the major problems facing Bleeding heart doves?

The Republic of the Philippines is recognised as being one of the most biodiverse countries in the world or ‘Biodiversity Hotspot’ (Conservation International, 1999, 2004). It also has a rapidly expanding human population, many of whom live in poverty and are dependent on subsistence agriculture for food. The consequences are obvious; as the demand for more farmland increases, so does the amount of forest loss – chopped down to make new fields or provide timber for houses, or firewood for cooking. On the island of Negros, in the West Visayas region, less than 5% of the original forest remains due to land change over the last 200 years. This is not only having a detrimental impact on the rural poor people who are dependent on the forest for livelihood, but also the exceptional and endemic biodiversity found there. Our flagship species is the Negros bleeding heart dove (*Gallicolumba keayii*), but the forests contain other high profile species that are are also facing extinction unless we can protect them and their habitat; e.g the Wreathed-billed hornbill (*Aceros waldeni*), the Visayan warty pig (*Sus cebifrons*), the Tarictic hornbill (*Penelopides panini*), and the Philippine spotted deer (*Rusa alfredi*).

In the Barangay (village) of Mantiquil, in the Cuernos de Negros, BZS and our partners have identified that the current rate of forest loss is one hectare per month. If we do not address this, then total deforestation could occur in this area within 20 years. The forest is home to populations of unknown size of all five species listed above, and there may be 30 or more bleeding heart doves left there – a relative stronghold – which we will survey in 2016.
SPOTLIGHT: THE PHILIPPINES

Urgent action is needed to prevent the tropical forests in the Negros Oriental from dramatically declining or disappearing. After several years of working in the area, the project team (in consultation with local NGOs, community associations, regional and national government departments and international conservation organisations) are working to develop and implement an interdisciplinary conservation strategy to address the current socio-economic and environmental challenges in the region, based on participatory ‘landscape planning’. The strategy is based on BZS’s experience of working with forest edge dwellers and those dependent on the natural resources provided by the forest. In Mantiquil, for example, we know that the water supply for the entire Barangay comes from the remaining forest on the uplands of the Canaway river valley – cutting this down will lead to a loss of a clean, permanent water supply for local people. Therefore, the objectives of the project include looking after human needs, as well as protecting the threatened wildlife species from poaching and their forest habitat from destruction due to land change use.

Over a period of many decades, the Canaway valley and the surrounding hillsides, have been deforested for agriculture; both subsistence (small scale) farming, as well as larger agricultural productivity (typically growing sugar cane). The only remaining forest that is not currently being cleared for farming is now found above elevations of approximately 800 metres.

The current pressures on the forest come mainly from ‘Kaigan’ farming (‘slash and burn’), and removal of trees for housing; both of which are causing long term loss of habitat for forest wildlife species. In addition, there is a culture of hunting of forest animals for food and sport. Philippine spotted deer and Visayan warty pigs are the main targets for hunting, but several other species are threatened with extinction due to opportunistic hunting; e.g., Negros bleeding heart dove, Wandenii’s hornbill and Tarictic hornbill, which are caught in snare traps scattered throughout the forest to catch any animal unlucky enough to encounter them.
SPOTLIGHT: THE PHILIPPINES

What are we doing to help?

Looking after human needs

Our approach is based on one that we have used successfully in other parts of the world, where we work with rural people to find ‘win-wins’ for both humans and wildlife. We utilise a ‘participatory learning and action’ process, engaging local people to improve their living standards in ways compatible to biodiversity conservation. In this particular context it means finding new approaches to living sustainably, such as supporting the creation of new local community associations and addressing current unsustainable farming methods. It is a long term process that requires the build-up of trust between the various actors such as the NGOs, government officials and local people. But experience has taught us that without this trust, remedial actions are simply not sustainable.

Throughout 2015, we have focused on building up the relationship with the communities, working with our partner NGO, PENAGMANNAKI (Pederasyon sa Nagkahiusang mga Mag-uuma nga Nanalipod ug Nagpasigugda sa Kinaiyahan, Inc), helping them to organise themselves into a collective that can make group decisions on how they develop their community. In October 2015, local communities held one of many community gatherings with the village of Naubo, a newly created village on the edge of the Mantiquil forest. We have been working with them for the last year, since we employed Jerald Olasiman as a Community Facilitator. Jerald’s role has been to work with local people to understand their challenges and build confidence, illustrating that the way we work is by helping people to shift their behaviour so that they may gain from the conservation of natural resources (including wildlife), rather than suffer.

Evidence of ‘kaigan’ farming in the Canaway valley

Jerald Olasiman, our Community Facilitator
One of the steps in the process of supporting local communities is through the creation of local associations. Helping people to organise themselves is fundamental to the association receiving support from local government and other institutions. We are pleased to say that during 2015, the community of Naubo formally declared themselves as a people’s organisation under the name of ‘Naubo Community Forest Association’. It is this association that will honour the conservation agreements we are putting into place.

Organising themselves is one of the first stages in finding solutions to the challenges facing the community. What follows from here is a pathway that we are very familiar with – discussions (arguments!) on the importance of the issues, agreement of priority areas to focus on, and ‘solutions’ for each of the priorities. We know it will be a long process, requiring our support over many years, and our commitment to conserving this critical area for wildlife is crucial if we are to conserve the threatened species with the forest.

Protection of wildlife and forests from land change and poaching

Of course, as well as supporting positive suggestions, we recognise that we need to put in place control measures to prevent further loss of threatened species and destruction of the forest. In order to do this, we concentrated on two main strategies in 2015:

1. increasing local protection by creating new protected areas,
2. increasing the amount of law enforcement to address illegal activities.

In theory, it is illegal to clear any standing forest in the Philippines, with digressions punishable by both fines and imprisonment, but a lack of enforcement resources at both the local (municipal) and national (Department for the Environment and Natural Resources (DENR)) level, as well as a cultural reluctance to confront people means that such illegal activities historically have gone unpunished.
SPOTLIGHT: THE PHILIPPINES

Under current legislation, a Municipality can assign additional protection status to areas that are deemed important to the people. In the case of Siaton Municipality (which contains the Barangay of Mantiquil), the Local Government Unit has declared the Mantiquil forest as a Critical Watershed Area and Critical Habitat for Wildlife. This local assignment is crucial in communicating with the local people why they cannot clear more forest, and is the basis for much of the work during 2015. The people living in the area already recognise the need to safeguard their water supplies, although there is a significant challenge in providing enough water for drinking and crop irrigation.

In addition to community discussions focused on sustainable development, the project has also employed a team of forest wardens, comprised of a supervisor and two forest guards. Their role has been to monitor the forest and report any illegal activities to the law enforcement agencies (DENR). We are pleased to report that our forest warden team are now accredited agents of DENR and have the power to arrest and produce portfolios for prosecution for any transgressors.

This approach of using both community rewards and law enforcement to promote cooperation is fundamental to achieving the aims of sustainable development whilst conserving threatened biodiversity. It is also the basis for our ‘Reciprocal Environmental Agreements’ with the local community members, whereby support for livelihood development is aligned to improvements in biodiversity protection.

We have achieved much in 2015 for the protection of the Mantiquil forest and its inhabitants, but we know that working with communities requires long-term, sustained commitment to support change. We expect it will be several years until we find that sustainable development is firmly established. BZS is committed to such long term planning and implementation, and we are thankful that operating Bristol Zoo Gardens and the Wild Place Project enables us to think in these time scales – we are here for the long haul, and we thank our donors for their continued support.
Illegal, uncontrolled hunting for all animals is on the rise in the forests of the Congo Basin. The forests have, historically, ‘always’ been the source of animal protein for local people. The increase in population numbers, changes in technology such as cheap, high visibility LED head torches, which aid night hunters, and an increase in demand for ‘bushmeat’ from urban dwellers, have all combined to put enormous pressure on wildlife.

This year, 2015, was the second full year of our Darwin Initiative, a project that supports local communities to change from unsustainable, illegal hunting, especially of threatened species, to new approaches of living sustainably. The project is located on the north east border of the Dja Biosphere Reserve (DBR), a World Heritage Site and where we have been working with local people since 2003. The aim of this project has been to confirm a ‘theory of change’ to address the loss of wildlife in the DBR, thus much of the focus has been understanding people’s behaviour and needs in greater depth. Specifically, we have undertaken research into areas where people hunt, the quantity of animals hunted, in an effort to determine if it would be possible to implement legal, sustainable hunting.

During 2015 we learned some vital pieces of information. For example, the vast majority of households living around the DBR are dependent on hunting to supply their animal protein dietary needs. The people simply do not have enough income to buy animal protein, and most parts of the forest outside of the DBR do not contain a sufficient number of animals to provide a sustainable source of food, even if the level of take remains the same.

There are areas where hunting could be controlled and managed to provide some of the villages’ needs. As a consequence, we have been involved in setting up a legal hunting zone, where a quota of non-threatened animals can be legally hunted and used for personal use, or for sale to generate income. An important aspect of the hunting zone is policing by the local communities, and the establishment of ‘anti-hunting patrols’ that report to a village committee. These patrols monitor the zone to make sure that both the levels of hunting, and the species taken, are in line with the management plan for the hunting zone.

But it is already clear that the hunting zone will be insufficient to meet local people’s needs for providing animal protein. Nor will it generate sufficient cash to be able to buy affordable meat and fish from elsewhere through the sale of ‘legal bushmeat’, which generates a higher price because it can be sold to urban markets. Our theory of change has highlighted the need to bring in both additional sources of revenue generating mechanisms, as well as affordable protein sources.
For the former, the communities have shown that they would like to try trading products such as cocoa; for the latter we have found that the preference would be for fish farming. The challenge for us now is to help the community to bring in these changes, supporting them not only financially, but also with capacity building so that they can trade and have the skills to (for example) operate a commercially successful fish farm. We know it will be difficult to find the funds to bring about these changes – there is little appetite for funding integrated conservation and development projects – but we will continue as best we can, using our network of contacts and highlighting the urgent need to help people and wildlife before all the animals in the DBR are effectively ‘hunted out’, which is a very real prospect.

We have also looked in detail at the way that the commercial trade operates in the poaching of gorillas and chimpanzees. Funded by the European Association of Zoos and Aquaria, in 2015 we employed uncover researchers to investigate how the ape trade currently operates in and around the DBR. They spent time with hunters, bushmeat market sellers, as well as people taking the meat to markets, and have collected enough information to produce an ‘ape-meat value chain’, which we are in the process of completing. The results are due to be published in 2016.

Finally, we have established a ‘Dja Actors’ Europe’ forum, comprising of the main European NGOs working for the protection of wildlife in the DBR. This forum will give technical advice and support to the Ministry to help it manage the DBR, including updating the DBR Management Plan.
Our work in Colombia in 2015 has continued to focus on supporting the creation of the San Lucas Parque Nacional Natural (PNN), in southern Bolivar (Departamentos Bolivar). For the past several years we have been a member of the Magdalena Medio Allianza (Central Magdalena Alliance), which is an informal group of NGOs working for the conservation of wildlife and natural resources in this important region of Colombia. The Central Magdalena Valley is part of one of the world’s 35 biodiversity ‘hotspots’, yet is going through an intense period of development.

After discussions in late 2013 between the various stakeholders concerned with the situation in the Central Magdalena Valley, the National Natural Parks of Colombia, a government entity in charge of the administration and management of the System of National Natural Parks (PNN) was given the go-ahead to gazette a new PNN in the Serrania de San Lucas. The region has long been noted as one of the last areas of primary forest remaining in the central Magdalena, and contains a spectacular array of biodiversity including brown spider monkeys (Ateles hybridus), white-footed tamarins (Sanguinus leucopus), spectacled bears (Tremarctos ornatus), jaguars (Panthera onca), and blue-billed curassow (Crax alberti).

Strategically important in Colombia’s development due to its location, the area is under threat from poorly managed infrastructure development, illegal gold mining, expansion of unsustainable oil-palm developments and urbanisation. Without ‘joined up’ thinking, transparent processes and effective assessment of impacts, the wildlife in the Central Magdalena Valley is under enormous threat, with the threat of extinction to several species and local people suffering from adverse health risks and loss of natural resources.

In keeping with our global strategies of supporting protected areas and species through working with local people to reduce anthropomorphic pressures on wildlife, BZS is focusing its efforts on engaging and helping Colombians to create livelihood development plans that are compatible with wildlife conservation.

The first part of this process is the building of trust and ongoing communication between local stakeholders. We are fortunate that the Parks Service is a highly committed and capable organisation and that they are overseeing the dialogues with local communities. Between us, we have already gained the trust of communities living in the area, who are in support of the new protected area.

One of the issues the protected area will help address is that of illegal gold mining, which has resulted in significant environmental damage and pollution of the waterways. Mercury is used in the process of gold extraction, which is then discarded as a waste product. This waste ends up in the rivers and poisons both the wildlife and humans who eat the polluted products.

Bringing together stakeholders working in the region to promote ‘landscape planning’ was one of the main drivers for BZS initiating a conference in the UK to promote ‘Colombia: An Opportunity for Green Business’. Held at Canning House in the UK, under the leadership of Baroness Hooper, Chair of the All Party Parliamentary Committee for Latin America, the conference promoted the use of biodiversity offsets as a “last resort”\(^2\), after all reasonable measures have been taken to avoid the negative impacts of a development project and to ensure no net biodiversity loss. We were delighted to have input from the Colombian Minister of the Environment and Sustainable Development, as well as Ambassadors from five Latin American countries attending, and a number of private sector and NGOs working in the area.

The United Kingdom has been an old friend and partner in all things environmental to Colombia. Recent visits have been made by the Deputy Prime Minister, Mr Nick Clegg MP, William Hague, and by His Royal Highness The Prince of Wales, both committed and outspoken supporters of environmental and conservation issues. This confirms the UK’s genuine interest and feeling of duty to help protect Colombia’s wildlife and, in doing so, to ensure a better place for generations to come.

The Conference covered what the newly-launched National Plan for Colombia aims to cover, and what the likely impacts will be for doing business in Colombia. It was positioned to be of interest to those companies either already working in Colombia, or looking to develop new opportunities there and who need to take into account how the National Plan to conserve biodiversity will impact on planning. The Conference was divided into two panels. The first concentrated on an overall view of conservation challenges and possibilities in the country, focusing on the management, development and future of a particular project being developed in Central Magdalena. The second panel discussed environment and conservation from a Colombian point of view, the aims of the recently launched National Development Plan 2014-2018 in regards to conservation and environment, and the financial and social challenges that “Green Businesses” face in Colombia. We are now looking at repeating the conference in Colombia in 2016.

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\(^2\) [http://bbop.forest-trends.org/pages/mitigation_hierarchy](http://bbop.forest-trends.org/pages/mitigation_hierarchy)
Madagascar is a biodiversity hotspot, and the only place in the world where lemurs can be found in the wild. Sadly, many species are threatened with extinction because of hunting and habitat destruction. We are in partnership with 30 European Zoos to help safeguard the future of Madagascar’s lemurs as part of the AEECL - the Association Européenne pour l'Étude et la Conservation des Lémuriens, a consortium that carries out conservation and research programmes for highly endangered lemurs, such as the Critically Endangered blue eyed black lemur (*Eulemur flavifrons*), the Critically Endangered Sahamalaza sportive lemur (*Lepilemur sahamalensis*) and the Endangered Sambirano mouse lemur (*Microcebus sambiranensis*). We are actively involved in field-based research, community-based development programmes with local people and captive care of zoo-based lemur populations.

The blue-eyed black lemur is among the world’s rarest and most endangered primates. With less than 1000 individuals estimated to be left in the wild, it has been listed as one of the world’s 25 most endangered primates. There has been an 80% population decline in this species, as well as in the Critically Endangered Sahamalaza sportive lemur, in the last 25 years. The Sambirano mouse lemur is also experiencing an ongoing decline in its population. Both the blue-eyed black and the Sahamalaza sportive lemurs occur exclusively on or adjacent to the Sahamalaza Peninsula in the northwest of the island.

Our project in Madagascar is based in the Ankarafa Forest; a protected area and reserve in northwest Madagascar. The field station is situated within the UNESCO Biosphere Reserve and APMC (Aire Protégée Marine et Côtière – protected marine and coastal area) Sahamalaza - Iles Radama.
In February, Dr Gráinne McCabe, Head of Conservation Science, visited the site to check in on some of our PhD and MSc students studying the behaviour and ecology of lemurs. We had two MSc by Research and four PhD students undertaking research projects in Madagascar in 2015. Their projects included a study on reproductive isolation mechanisms and possible hybridization between blue-eyed black (*Eulemur flavifrons*) and black (*Eulemur macaco*) lemurs in northwest Madagascar by PhD candidate Caitlin Eschmann (University of Bristol) and behavioural ecology and bioacoustics of the Sambirano mouse lemur (*Microcebus sambiranensis*) by MSc student Daniel Hending (University of Bristol). MSc student Donnacha Burke (University of Bristol) is in the process of completing his thesis for his project on the examination of the population status of the Endangered Madagascar Sacred Ibis (*Threskiornis bernieri bernieri*). In October, Jack Saunders began planning his PhD project on the efficacy of reforestation efforts in northwestern Madagascar by examining wildlife usage of reforested areas. He begins his fieldwork in 2016.

In order to make a lasting difference to both the environment and the lives of the local people, it is imperative that conservation organisations such as BZS work together with communities to discuss beneficial changes that will positively affect the area and the people. Using this approach, we have implemented development programmes and conservation education that include help with cultivation, reforestation, fire control and protection, schools and the provision of clean drinking water from wells. During her visit, Gráinne also visited some of the local schools supported by BZS. The Society helps to pay the salary of over 60 teachers in more than 30 schools in the Sahamalaza region. Our funds also help to build new wells to provide clean, safe drinking water in remote villages.
The African penguin (Spheniscus demersus), also known as the jackass or black-footed penguin, is the only penguin species found in Africa. Living in large colonies along the rocky Southwest African coastlines and islands, they are one of the most northerly found penguin species. Along with Humboldt, Magellanic and Galápagos penguins, they can survive in more temperate climates by benefitting from oceanic upwellings which bring cold, nutrient-rich ocean water to the surface; supporting an abundant food chain.

Between 2001 and 2013 alone, the global population of African penguins fell by a devastating 70%, leaving less than 18,000 breeding pairs in the wild. As such, this species is now classified as Endangered and faces a significant risk of eventually becoming extinct if action is not taken to reverse their demise. Sadly, as is repeatedly the case worldwide, the main threats to their survival are human-derived.

The main causes of this decline are overfishing off the coast of the South Africa and Namibia, and oil spills. Worldwide, 30% of fisheries landings by weight are forage fish (e.g., sardines and mackerel); however, these species also support many predators, including penguins. In South Africa, environmental change and fishing pressure have caused these species to spawn further east than two decades ago, out of reach of penguins on the west coast much of the time. However, because fishing vessels mainly operate from west coast ports and, like birds, are limited in how far they can go to find fish, the result has been heavy fishing pressure where the fish have become scarce. As fishing can amplify forage fish collapses, competition around the penguins’ breeding colonies may now be too high, contributing to declines in this endangered species.

Oil spills are also a major penguin problem. When penguins come into contact with oil, they lose the water-proofing quality of their feathers and swallow the oil as they try to clean themselves, leading to high levels of mortality. Two individual oil spills (in 1994 and 2000) in range of their habitats have killed around 30,000 individuals.

Bristol Zoological Society (BZS) are a key partner of a local conservation rescue centre in South Africa (SANCCOB - Southern African Foundation for the Conservation of Coastal Birds) since 2006, which hand-rears abandoned chicks and offers rehabilitation to chicks that have been oiled. Around 1000 oiled penguins are brought to SANCCOB’s rehabilitation centre each year.
Volunteers help to de-oil, clean and nurse them back to health, before releasing them back into the wild. In 2015, SANCCOB successfully cleaned and released 34 penguins oiled from a spill of unknown origin of the Eastern Cape.

Bristol Zoological Society and SANCCOB, along with several other professional partners, have also worked together to set up the Chick Bolstering Project (CBP). One aim of this project is to investigate the effectiveness of bolstering declining African penguin colonies by reintroducing hand-reared chicks. The project is also working to develop the infrastructure and knowledge required to relocate birds to establish new colonies along the Eastern Cape of South Africa – locations more conducive to successful survival of the species, as they are closer to the current centres of gravity of small pelagic fish, a penguin dietary staple.

Rehabilitated penguin swimming at SANCCOB prior to release

We are also working with partners to monitor the penguin population on Robben Island, a key penguin breeding colony and in 2015, BZS post-doctoral research associate, Dr Richard Sherley, oversaw the work of inserting small transponders, like microchips we put in our pets at home, into the newly released SANCCOB hand-reared penguins. Previously, each transponder had to be read with a hand-held transponder reader in close proximity to each penguin, which is time-intensive and potentially stressful to the animals. In 2015, we purchased a large transponder reader that records which penguins come up into the colony each day as they pass a large cable, allowing us to monitor the colony more easily, less intrusively and with greater efficiency.

In response to the species’ worsening conservation status, South Africa’s fisheries department agreed to investigate the potential benefits to penguins of spatial fishing restrictions. Temporary fishing closures were implemented around four key colonies, with the aim of taking pressure off the penguins during the breeding season. Restrictions have made it easier for penguins to find food at the four main colonies in South Africa. But in 2014, Robben Island was reopened to fishing. This allowed Bristol Zoo, with the University of Bristol, to compare the Robben Island colony under different fishing conditions. In 2015, BZS and University of Bristol MSc by Research student, Jennifer Grigg, began monitoring adult penguin foraging behaviour using GPS logger devices, and recorded growth and body condition of penguin chicks. This information is being compared with data from previous years and a neighbouring colony to determine if fishing closures are helping African penguins. So far, chick body condition seems to be better when the fishing restrictions are in place, indicating that they can be a useful penguin conservation tool. When complete, this study will provide important insights into the penguin-fisheries relationship, and if shown to be effective, may result in the introduction of long-term restrictions to fishing around penguin colonies.

BZS MSc student Jennifer Grigg attaching GPS loggers to penguin to measure foraging trip duration
UK: AVON GORGE AND DOWNS

The Avon Gorge is one of the most important botanical sites in the UK. During 2015, the project continued to protect nationally rare plants and restore species-rich grassland through our goat browsing project and targeted conservation works.

Encouraging results showed the presence of moths at all 11 sites surveyed. The maximum peak count was 230 moths – an increase on the maximum peak counts from the past two years.

The education officers for the project are based in the Conservation Education Centre and managed by the Head of Learning. During the year, 13,680 people took part in one of our walks, talks, courses, educational visits, family or community events. We had our best year yet for teaching school groups with 1,840 school children taught (compared with 1,809 children in 2014).

The site is also important for its invertebrates and BZS staff undertake annual monitoring of the silky wave moth (the Gorge is the only English site for this species). During the summer, all six priority sites along the Gorge were surveyed each week for the eight-week flight season. Seven satellite sites were also monitored.
UK: AVON GORGE AND DOWNS

For the Bristol Festival of Nature we teamed up with the rest of the Zoo’s education team and Wild Place Project to run the ‘Bugs!’ tent. Our aim was to increase positive attitudes towards invertebrates. In total, 9,000 people visited the tent over the weekend.

The project reached a national audience when 6.33 million people watched the special ‘Where town meets country’ episode on the BBC’s Countryfile programme. The profile of the site was also raised as one of the sculptures on the Shaun the sheep trail, ‘Bloomin’ Gorge-ous’, was decorated with images of gorge’s rare plants. We contributed educational activities for the ‘Shaun in the City Nature Explorer’ booklet which could be picked up from the Tourist Information Centre. 40,000 copies were also given away in The Post.

Bristol 2015 European Green Capital Year provided us with many extra opportunities to engage with the public and widen our audience. We ran drop-in days at the Bristol 2015 Science Lab, the Bristol Royal Infirmary and took part in three special Portway Sunday community events. We were filmed teaching a ‘Fabulous falcons and food chains’ session with Parson’s Street Primary for the ‘Best of Bristol virtual fieldtrip project’. We supported an artist who worked with community groups to create 1,020 ceramic starlings that were displayed on the Downs as an art installation. We also provided reference images and information to go with prints, placemats and coasters featuring the gorge’s rare plants, goats and peregrines which were sold in the Made in Bristol shops during 2015.
The white-clawed crayfish *Austropotamobius pallipes* is the UK’s only native freshwater crayfish species and is a keystone species of our river habitats. As a result of pollution, habitat degradation and competition from invasive crayfish species it has become endangered throughout its range, in both the UK and the rest of Europe. One of the primary protagonists for the decline in white-clawed crayfish numbers is the American signal crayfish (*Pacifastacus leniusculus*). Introduced into the UK in the 1970’s for shellfish farming, many signal crayfish escaped and migrated rapidly through our waterways. They not only predate and out-compete our native species but also carry crayfish plague, a fungal disease that is lethal to European crayfish and can eradicate entire white-clawed crayfish populations within a few weeks.

For the last 6 years BZS has, in partnership with Buglife, Cefas, the Environment Agency and Wildlife Trusts, been playing a pivotal role in crayfish conservation in South West England. This conservation partnership has developed a white-clawed crayfish captive breeding hatchery at Bristol Zoo, established a number of white-clawed crayfish ark sites (safe refuges for translocation of threatened populations), in addition to outreach and communication programmes.

Itchen in Hampshire is one of two known white-clawed crayfish populations in the county so preserving it through captive breeding is a key objective.

Following the first supplementation of captive born crayfish into the River Itchen in 2014, over 100 additional captive born individuals were released in 2015. Furthermore, in 2015 we also released 140 captive-bred white-clawed crayfish released into a new Somerset ark site. This is the first fully captive-bred ark site in Somerset, and thus represents an important long-term research site. Our white-clawed crayfish conservation effort is backed by a research programme, helping to evaluate its success and inform future strategy.

Our outreach programme continued unabated throughout 2015, delivering key messages to waterway users on how to help conserve crayfish, with audiences ranging from institutions such as Natural England, Bristol City Council and Bristol Water, to local groups such as the Women’s Institute. Five public zoos took on our captive bred crayfish for outreach and potential breeding programmes in 2014. In 2015, we transferred captive bred crayfish to another three institutions (2 colleges and a local fishery hatchery).

As part of the ongoing captive breeding programme here at BZS, 80% of wild-caught females mated successfully to produced viable offspring in 2015. This resulted in over 1000 hatchlings, who will be grown on in captivity for *in-situ* release in subsequent years. The River
UK: INVASIVE WEEDS

Invasive non-native species (INNS) are one of the main drivers of biodiversity loss at the global level. They can change the community structure and species composition of native ecosystems directly by out-competing native species for resources. INNS may also have important indirect effects through changes in nutrient cycling, ecosystem function, the spread of disease, and ecological relationships between native species. In addition to harming native biodiversity, INNS have negative social and economic impacts. They cost the UK economy over £1.8 billion per annum. INNS also have wider societal impacts, for example by increasing flood risk, impacting on human health, and reducing access to amenity areas.

The Avon Invasive Weeds Forum (AIWF) project has been running full time since 2012. It is run by a robust network of informed individuals and groups that comprise the wider Avon Invasive Weeds Forum, fighting the advance of INNS.

During the winter of 2014, the AIWF was successful in gaining a funding grant from the SITA Trust to continue work throughout 2015. The number of events carried out to combat INNS increased markedly. In total 66 invasive weed management events were carried out with over 3000 hours of volunteer time accumulated. On some stretches of the River Frome the extent of the Himalayan balsam, Impatiens glandulifera, has decreased by over 60 percent. During the summer of 2015 seven local conservation groups were presented with Community Action Kits to help them continue INNS management along their designated local riparian habitat.

In the summer of 2015, we trialled a novel method of Japanese knotweed (Fallopia japonica) control. We released 6000 psyllids (Aphalara itadori), which feed only on the stems of the Japanese knotweed. The AIWF is supporting CABI (Centre for Agriculture and Biosciences International), who have undertaken the scientific research on this problem and are world experts in natural control using psyllids.

Raising awareness of INNS continues to be a priority along with what can be carried out by individuals and organisations to slow the spread of INNS, such as biosecurity measures and ‘Check, Clean and Dry’ approach to reduce the spread of invasive flora and fauna. In 2015 twenty awareness events were carried out including Parish Council meetings, Bristol Festival of Nature and INNS lectures to students studying at Bristol Zoo. In addition, over 70 operational field staff have been trained in INNS identification and biosecurity methods.

At the end of 2015 the AIWF was again successful in a funding bid from the Veolia Environmental Trust to continue the project throughout 2016.
Bristol Community Plant Collection was set up as a pilot project in 2012 to explore the possibility of establishing a collection of an annual plant, Calendula, grown in many locations across Bristol by community groups.

Due to the initial success of the pilot year, Bristol Zoo Gardens have achieved many ‘firsts’ in the field of plant conservation. Plant Heritage, who oversees National Plant Collections, have rewritten their guidelines to accommodate this new type of ‘Dispersed’ collection. It is also the first National Plant Collection that looks after an annual plant (Calendula) and also have community groups and schools as their growers.

The project now grows nine of the twelve species in the genus including the Critically Endangered *Calendula incana subsp. maritima*. It has also had unexpected outcomes for many of the older participants such as community cohesion, increased feelings of self-worth in individuals and an increased desire to improve their own environment.

In 2015, over 150 people participated in the project with the youngest being just 20 months old and the oldest aged 99. Bristol Community Plant Collection was, once again, invited again to the RHS Hampton Court Flower Show, winning a Silver Medal.

The work of the project has featured in the UNESCO International Conference Proceedings paper ‘Botanists of the twenty first century: roles, challenges and opportunities’. It also featured in the paper ‘How can Botanic Gardens grow their social role?’ by Bernadette Lynch, in which Bristol Zoo Gardens is listed as an 'inspirational botanic garden' by international peers for the work of Bristol Community Plant Collection.
Big Bugs Behaviour Change Campaign 2015

Every year, Bristol Zoological Society carries out a conservation campaign on a current issue threatening biodiversity, and with the launch of the 10-year Strategic Plan 2015-2025, the Society aims to promote environmentally friendly action in 15% of guests. This year we launched ‘Big Bugs’, a campaign encouraging guests to help native bug species by creating a suitable habitat for them. The campaign ran from March to September 2015 at Bristol Zoo Gardens, and four members of staff (‘Bug Rangers’) were hired to deliver the majority of the campaign to our guests. We were able to promote the campaign and encourage bug friendly action to 8.7% of total Zoo guests who visited Bristol Zoo Gardens, at the main campaign space during the months of June, July and August, which is a great achievement for the first year of the 10-year Strategic Plan. The campaign involved three main elements, the Bug Hub, the Bug Trail and the Bug Show.

The Bug Hub – an open space where guests could talk to the Bug Rangers, learn how to help bugs at home, and take part in bug themed activities, including:

- **Pledge a patch for bugs** which involved guests making a pledge to carry out a bug-friendly action. This pledge could be growing wild flowers, making a bug home, creating a water space, making a log pile or letting an area overgrow.
- **Adopt a bee** where guests could draw a bee onto large 3D bee hives.
- **Making bamboo bee homes.**
- **Viewing live bugs during Bug Hour.**

Big Bug Trail – upon entry to the Zoo, guests were given a Big Bug Trail map which guided them to 13 large animatronic bugs located throughout the Zoo. Daily Big Bug talks took place on the emperor scorpion, giant devils flower mantis, red-kneed Mexican tarantula and stag beetle.

**Bug Show** - an interactive lunch time show about a Bug Ranger superhero who was searching for their bug friends. The show discussed the threats affecting UK bug populations and highlighted the actions which guests could take to help protect bug habitats in the UK.
UK: CONSERVATION CAMPAIGN

During the campaign, approximately 23,066 guests visited the Bug Hub, with August being the busiest month (10,510 guests; 9.4% of total Zoo guests), 4,773 guests attended the Big Bug talks, 5,411 guests watched the lunchtime Bug Show, and 1,875 bamboo bee homes were made.

A total of 5,273 ‘pledge a patch for bugs’ pledges were made. The most popular pledge made was growing wild flowers followed by making a bug home and letting an area overgrow. Some guests made an ‘other’ pledge which included actions such as ‘not standing on bugs’ and ‘not picking flowers’.

![Pie chart showing pledges made during the campaign](image1)

Data collected from pre- and post-campaign surveys show that guest knowledge on bugs and their attitude towards them improved after being exposed to the campaign. Guests who took part in at least one campaign element had a better understanding of the threats affecting the survival of bugs compared to guests who had never seen the campaign. The main threats which guests had greater knowledge on was pesticide use and climate change. Furthermore, 70.6% of guests learnt new information directly related to bugs during the campaign.

The guests’ attitude towards bugs also improved with a larger number of guests acknowledging that bugs were important after seeing the campaign, and that a reduction in bug species would affect their daily lives. Furthermore, a significant difference was found in the level of concern that guests felt about the threats affecting bug populations in the UK, with guests feeling more concerned after being exposed to the campaign.

The campaign also helped provide guests with relevant knowledge on bug-friendly actions which they could perform after their Zoo visit. It was found that 61% of guests felt they learnt useful information on how to help bugs, and 62.2% of guests were influenced by the campaign to take bug friendly action at their own home. Finally, guest feedback was very positive and 77.2% of guests exposed to the campaign enjoyed learning new information.

Even though we were unable to measure actual behaviour change in guests who took part in the Big Bugs campaign, we are aiming to develop methods of data collection which will enable us to evaluate short-term and long-term behaviour change for future campaigns.

![Image of a guest at the Bug Trail](image2)

The Bug Trail at Bristol Zoo Gardens
MEET THE CONSERVATION PROGRAMMES TEAM

Head of Conservation Programmes

Neil Maddison (MBA, BSc (Hons))

Neil gained his first degree in Zoology at the University of Bristol and went on to work for several conservation charities before joining Bristol Zoological Society in 1997, initially as Development Manager. His experience in field conservation has led him to appreciate more fully the link between meeting people’s needs and wildlife conservation. He now specialises on working with communities to develop sustainable solutions whilst taking pressure off natural resources, looking for practical ways to support disadvantaged people in their development. These solutions often lead to an examination of the ‘business case’ for conservation, and creating new sources of revenue for local communities to find ‘win- win’ solutions for people and wildlife.

Neil obtained his MBA from the University of the West of England, with a specialisation in pro-poor ecotourism. He is a Trustee of Ape Action Africa, an NGO working to address the commercial bushmeat trade in Africa and was previously a Trustee of the Hawk and Owl Trust. He is also currently a member of the Conservation Specialist Breeding Group and the Association of MBAs.

UK Conservation Manager

Jen Nightingale (PhD Candidate, MSc)

Jen Nightingale gained a degree in Zoology from the University of Bristol, a Masters in Wildlife Management and Conservation from Reading University and is currently working towards her PhD. Jen is a full member of the Chartered Institute of Ecological and Environmental Management, and is on the Steering Committee of the BIAZA native species focus group.

With extensive experience in the aquarium industry, from Vancouver Aquarium and European Sealife Centres, she became Curator of the Aquarium at Bristol Zoo Gardens in 1997 where she focused on a programme of extensive modernisation of exhibits, off show breeding facilities, infrastructure and educational themes.

During this time Jen also played a major role in two successful water vole reintroductions and extended this to establish the position of UK Conservation Manager within the Research Department. Within this current role Jen focuses on the conservation of UK species both in- and ex-situ species. A strong focus of her work is on the conservation of the endangered white-clawed crayfish Austropotamobius pallipes and Jen was pivotal in the establishment of the South West Crayfish Project, the largest white-clawed crayfish initiative in the UK. This work has now expanded into her Ph.D. investigating optimal hatchery techniques for the captive breeding and rearing of A. pallipes for reintroduction.
Neil Green (FdSc in Environmental Management)

Neil’s past experience has included life guarding in Cumbria, teaching English in Madrid, exporting oil for BP lubricants, building balconies in Bondi and running his own landscape business in Wiltshire. In more recent years Neil has been a Coastal Ranger for the National Trust in North Cornwall, worked on the Source to Sea Invasive species project for Wiltshire Wildlife Trust and worked on Phase one of the Westonbirt Project.

Neil works mainly on the rivers and watercourses within Bristol, South Gloucestershire and Bath and North East Somerset. The AIWF is an independent group of relevant stakeholders such as Bristol City Council, Bristol Zoo Gardens, The Environment Agency and South Gloucestershire Council, currently funded by Defra. The aim is to survey as much of the Avon catchment as possible for Non Native Invasive Weeds (NNIW), so far over 70 kilometres of riparian habitat have been recorded. Once the surveys are mapped alien species can be controlled and reduced in abundance.
MEET THE CONSERVATION MEDICINE TEAM

Michelle Barrows  
Head of Conservation Medicine

Michelle studied zoology at UCL and veterinary medicine at Glasgow University and has a RCVS diploma in zoological medicine and a Post-Graduate Certificate in Conservation Medicine. She has been Head of Veterinary Services & Conservation Medicine at BZG since 2010, is a clinical teacher at the University of Bristol Veterinary School, and a unit director for the MSc in Global Wildlife Health and Conservation. She is interested in disease risk assessment and preventative medicine, and is conducting *in situ* biomedical evaluations of Critically Endangered lemurs and disease surveys of wild cranes in South Africa.

Rowena Killick  
Veterinarians

Rowena qualified as a vet from the University of Edinburgh in 1997 and spent several years in veterinary practice before completing the MSc in Wild Animal Health at RVC/ZSL in 2005. She completed a three-year residency at Bristol Zoo Gardens/University of Bristol, during which she achieved her RCVS Diploma in Zoo Medicine (Mammalian), and is a clinical teacher for Bristol vet school. Her research interests include vitamin D and calcium metabolism in primates, and zoo animal training for husbandry and veterinary procedures. She is also currently conducting a biomedical evaluation of freem ranging Sahamalaza sportive lemurs in Madagascar.

Richard Saunders  
Veterinarians

Richard is a RCVS Registered Specialist in Zoo and Wild Animal Medicine (Mammals). He gained his BSc and BVSc from Liverpool University and has worked in a charity wildlife clinic plus private veterinary practice. For the past 8 years he has worked in Bristol Zoo Veterinary Department and within private practice for exotic animals. He has supervised student projects on gorilla reproduction, infectious diseases in rabbits and gastrointestinal bacteria flora in birds. His research interests include rabbits, rodents, birds of prey, marine mammals and invertebrates.

Charlotte Day  
Veterinary Intern

Charlotte graduated from the University of Bristol with degrees in Veterinary Science and Zoology (2008). She then worked in mixed veterinary practice and a private exotic pet clinic (reptiles, birds, small/exotic mammals and wildlife) in addition to volunteering as a part-time small carnivore keeper at Port Lympne Wild Animal Park, and assisting in the veterinary care of gorillas, chimps and other primates at Ape Action Africa (Cameroon). Charlotte started a veterinary internship at Bristol Zoo in 2014. She is also the Veterinary Advisor for the BIAZA Small Mammal focus group.
Since February 2015, veterinary staff at BZS have been involved in a conservation medicine project in Madagascar, part funded by the American Association of Zoo Veterinarians’ Wild Animal Health Fund and the Association Européenne pour l’Étude et la Conservation des Lémuriens (AEECL). We are carrying out the first biomedical evaluation of the Critically Endangered Sahamalaza sportive lemur, *Lepilemur sahamalazensis*. This small nocturnal lemur is found only within a 10km² area in the Sahamalaza Peninsula in northwest Madagascar.

Biomedical assessments have previously been used as tools for monitoring the population health of several other free-ranging lemurs. They are particularly useful for threatened species, where small population size means that anthropogenic (human) disturbance or disease epidemics could have potentially catastrophic effects. We are maximising data collection from this species during a concurrent study into its social system and vocal communication, whereby individuals are anaesthetised and fitted with radio-collars. Our objective is to collect biomedical samples and other data to allow development of reference ranges of biomedical parameters (e.g., biochemical and haematological variables, and parasites) for the Sahamalaza sportive lemur.

BZS vets Michelle Barrows and Rowena Killick caught 22 sportive lemurs in 2015 with veterinary intern Charlotte Day due to continue the project in 2016. The lemurs were caught using a blowpipe dart with an anaesthetic drug and were transported a short distance to camp for examination, sampling and fitting or removal of radio-collars.

Measurements were taken and blood and faecal samples collected from each individual before they recovered from the anaesthetic and were released back where they were found during the night. Some samples were analysed in the field and others brought back to laboratories in the UK. Blood samples have been analysed for biochemical and haematological parameters, as well as tested for specific diseases such as toxoplasmosis. Faecal samples have been examined for parasites and cultured to determine normal faecal flora. The biomedical data we are collecting will be useful for future management of both free-ranging *L. sahamalazensis* and for a potential future captive population, as proposed in the action plan ‘Lemurs of Madagascar: A strategy for their conservation 2013-2016’.
MEET THE CONSERVATION LEARNING TEAM

Head of Conservation Learning

Simon Garrett

Simon studied biology at the University of Bristol. After leading a post-grad expedition to the forests of Venezuela, he started as an Education Officer at the Zoo, and now, 25 years later, leads a sizable Learning Department, encompassing all aspects of formal and informal learning, and working closely with the Conservation Science department in the delivery of Higher Education programmes. He was a member of the BIAZA Education and Training Committee, and is a member of the International Zoo Educators' Association. He also sits on the steering group of the Bristol Natural History Consortium, and is part of their committee that oversees the annual ‘Communicate’ conference. His main interest is developing the role of zoos into the field of encouraging wildlife-friendly actions in zoo visitors.

Dave Naish

Dave completed a degree in Zoology at Nottingham University and then headed to the Amazon to work as a naturalist guide, and as a mammologist doing large mammal surveys for Conservation International. He joined the Zoo in 2001 and now manages the Education section and its formal learning output to the 42,000 school and college students that visit. He is also currently Chair of the Learning and Volunteering Committee for the British and Irish Association of Zoos and Aquariums (BIAZA), promoting best learning practice amongst the 112 BIAZA members.

Avon Gorge and Downs Biodiversity Education Officer

Mandy Leivers

Mandy Leivers studied biological sciences at Birmingham University. During this time she discovered her passion for British wildlife and practical conservation. After graduating she spent nine years working for the British Trust for Conservation Volunteers before running a project to protect hedges and dry stone walls in Bath and North East Somerset and South Gloucestershire. In 2000 she studied for a Post Graduate Certificate in Education at Bath University. Since 2011, Mandy has been the Avon Gorge & Downs Wildlife Biodiversity Education Officer. In this role, she delivers a popular programme of education, interpretation and promotional work to encourage greater public involvement, understanding and enjoyment of the wildlife interest of the Avon Gorge and Downs.
Tania Dorrity  
**Wild Place Project Learning Officer**

Tania originated from Zimbabwe before reading zoology & botany at the University of Cape Town. After her degree, she worked for the BBC Natural History Unit. She spent the next 24 years making wildlife documentaries such as The Really Wild Show, Big Cat Diary, Wildlife On One and Deadly 60. In 2010 she left the BBC to fulfil another lifelong ambition. To teach. After two and a half years’ teaching science & biology in secondary schools, she joined Wild Place Project in 2014 to set up the learning programme and implement theming and interpretation.

Sam Western  
**Senior Ranger**

Sam holds an undergraduate degree in Psychology, with a focus on animal behavior, and a Diploma in the Management of Zoo and Aquarium Animals. She started working at the zoo in 2008 as a Seasonal Ranger. She then worked briefly at Paignton Zoo before returning to Bristol Zoo to work on the Presentations section with the Amazing Animals and seals. Sam now manages a team of Rangers who deliver the informal learning schedule in the zoo, including enclosure talks, working in walkthrough animal enclosures, and busking around the zoo. The team also provide extra value experiences such as behind the scenes tours for guests staying in The Lodge.

Ann Lovell  
**Manager of Volunteer Services**

After 15 years in the Financial Services Industry Ann joined BZS in 2000, and she now manages the volunteer services. Since starting at BZS Ann has helped to increase volunteer numbers at Bristol Zoo Gardens from around 60 in 2000 to over 250 currently. Ann has also been integral in developing and maintaining the volunteer scheme at Wild Place Project, which now boasts over 100 volunteers.

Phil Jearey  
**Graphics Manager**

Phil was born in Zambia and came to the UK in 1985 to study. In 1989 he moved to Bristol to undertake a degree in Graphic Design at the University of the West of England. Phil began working for the Bristol Zoological Society in 1993. He has had his current role manager of the Graphics Section since 1996, where he oversees the society’s wildlife illustrator and graphic designers.

Daniel Days  
**Theming and Interpretation Coordinator**

Daniel studied sculpture and photography before obtaining a degree in music at Bretton Hall. He subsequently worked in stage and set design, eventually retraining as a joiner, and engaging more and more in construction management. Daniel also worked as a safari guide, running overland trucks throughout central and eastern Africa, and has been accredited by Namibian based conservation organisation Cyber-Tracker, as a level 3 specialist tracker. Daniel’s main responsibilities within BZS are to coordinate the interpretation and theming projects both at the Zoo and Wild Place Project.
After much planning, moving, dust, noise and disruption, the extension to the Conservation Education Centre building was handed over in January. Official authorisation to use the name BZS Institute of Conservation Science and Learning was received from Companies House in January, and the official opening was by Inger Andersen, Director General of the IUCN on 8th June 2015. This now houses our new teaching rooms, student common room, computer suite, lab and library. Setting up the latter involved carrying 6,000 books from the old portacabin, and starting the long process of sorting, cataloguing and rationalising the collection.

The department carries out many functions that support and deliver the conservation and education charitable objects of the Society, and provide an informative and engaging visit for our guests:

- The graphics team produces most of the communications pieces for the Society, including materials for getting conservation messages across to our guests – interpretation on what the Society does, as well as materials to deliver the guest action campaign.
- The volunteer team manages upwards of 300 volunteers across the Society, supporting most departments, and delivering Animal Encounters – 1,008 of which were delivered through 2015 (many with a conservation message). The section’s income (£67,103 in 2015) helps support the Society’s work.
- The ranger team delivered 2,952 talks to 96,292 guests throughout 2015. They play a crucial role in giving guests a great day out as well as informing them and enthusing them about wildlife and the work of the Society. When appropriate, the talks inform and encourage guests to engage in wildlife-friendly behaviours: looking for the MSC or FSC logos when shopping for example. This forms part of the Society’s developing work in attempting to support positive wildlife conservation outcomes through our guest interactions.
- The Education section beat their teaching numbers record yet again: 40,061 pupils and students were taught in 1,557 sessions, both in the Zoo and on outreach. The June figure was the busiest teaching month on record: 7,212 pupils in one month. This output consists of over 50 different session titles, tailored for the needs of visiting groups. But it’s not just about the numbers; sessions such as classification, art and design, pets and animal care, and primate communication are all delivered as part of the educational mission of engaging people with the natural world.
If we home in on conservation, 32% of sessions had a significant conservation focused component. Analysis of feedback from these sessions shows that, as a result of their session:

- A key annual outreach event was our BZS bug-themed tent at the Festival of Nature. The Zoo, Wild Place Project and the Avon Gorge and Downs Wildlife Project shared the tent and delivered a family friendly experience. We received 9,500 visitors over two very busy public days and education staff taught 250 children on the schools’ day. The aim, again, was to engage people with the natural world of bugs, and to inspire and enable positive action.

Even for sessions where conservation was not the focus:

Over two days, 9,000 people came through the Bristol Zoo tent at the Festival of Nature, to find out how best to help bugs

The Education team taught over 40,000 pupils and students in our themed classrooms during 2015

Learning provision at Wild Place Project grew rapidly throughout 2015:

1,985 students were taught in over 100 sessions
MEET THE CONSERVATION BREEDING TEAM

Head of Conservation Breeding

John Partridge

John Partridge, the senior curator of animals at Bristol Zoo Gardens, began working at the zoo in 1975 when he was 20 years old. His first job was with the apes – families of gorillas, orang utans, chimpanzees and gibbons. He has worked with a host of animals in the 41 years since, including some of the Zoo’s most well-known inhabitants such as Wendy the elephant and gorillas Samson and Delilah who produced Daniel, the first baby gorilla to be successfully reared in the UK. Although predominantly specialising in the husbandry and care of mammals, John has also worked with the reptiles and amphibians at the Zoo, to broaden his knowledge and experience. Today his work is less hands-on and more in a supervisory capacity – planning and managing the Zoo’s animal collection and ensuring it is developed with a strong focus on global species conservation, in line with the Society’s mission statement and strategic plan. John also supervises a large team of keepers, volunteers and students within the animal department.

Curators

Mark Bushell – Curator of Invertebrates

Mark has been at BZS since 2010, having previously studied invertebrates as a private individual. He is vice-Chair of the BIAZA Terrestrial Invertebrate Working group and chair of EAZA’s Terrestrial Invertebrate Taxon Advisory Group. He also oversees the Invertebrate Regional Collection Plan for EAZA, and works closely with the IUCN Species Survival Commission on the Spider & Scorpion and Grasshopper Specialist Groups. Mark works on many key invertebrate conservation projects, including the Crau Steppe grasshopper, the Desertas wolf spider and the Spiky yellow woodlouse.

Tim Skelton – Curator of Reptiles and Amphibians

After initially training as a cook and then a veterinary nurse, Tim studied applied zoology at Bangor University before completing a Masters in “Applied Animal Behaviour and Animal Welfare” at the University of Edinburgh. After graduating in 1994, he began as a trainee reptile keeper at Edinburgh Zoo where he studied for my zoo-keeping qualification. Tim has worked for BZS since January 1999 as head of the reptile section. He is now curator of reptiles and amphibians, and head of the ectotherm section. Tim created studbooks for the African pancake tortoise, yellow headed day gecko and more recently lemur leaf frogs. His current interests include DNA research within these studbook species to try and manage them more effectively and the captive breeding of the many species currently housed within the section.
Jonny Rudd – Aquarium Curator

Jonny has been working for BZS since 1999. After studying for a BSc in aeronautical engineering he changed career paths to pursue his interest in animal care. Initially he worked with a large range of species from nocturnal mammals, reptiles, fish and aquatic invertebrates, but Jonny soon found his interest focusing on aquatic animal care. After completing a foundation degree in Zoo resource management in 2008 he took on the role of aquarium curator. Managing a large facility consisting of 23 public displays and over 100 offm show research and breeding tanks, Jonny is responsible for the care of over 3000 individual fish, corals and aquatic invertebrates. His interests include the breeding and rearing of seahorses, conservation of endangered fresh water fish, and captive care and propagation of stony corals.

Richard Switzer – Curator of Birds

Rich has recently joined Bristol Zoo Gardens as Curator of Birds. He has a special interest in techniques and strategies at the interface between captive breeding and the restoration of species in the wild. His bird conservation career started with the Mauritian Wildlife Foundation, developing programmes for threatened native Mauritian songbirds. Following that, he spent a decade in Hawaii working for the San Diego Zoo’s Institute for Conservation Research, managing captive breeding and reintroduction programmes for some of Hawaii’s most threatened native birds. For two years he worked in Qatar as Bird Curator at the Al Wabra Wildlife Preservation and he has also carried out fieldwork with threatened birds in French Polynesia and Galapagos. With a background in teaching, Rich is a long standing member of the faculty at the Durrell Conservation Academy in Jersey.

Lynsey Bugg – Curator of Mammals

Lynsey studied for an Ecology degree at the University of Plymouth before moving to Bristol where she began her zoo keeping degree as a volunteer one day a week on the Primate Section, as it was then. In 2000 she secured a part time position, and then a full time position one year later. Her first full time role was a keeper in Twilight World, working with a variety of nocturnal species. Her interest for primates in particular remained and as her career progressed she moved back to primates but also trained on large mammals. During the 16 years she has been at BZS Lynsey has worked her way up to Mammal Curator and is now responsible for running the Mammal Section with over 40 species, plus a team of nineteen keepers and volunteers and students.
This year was a busy and successful year of conservation breeding achievements in the BZS Animal Department.

In spring, we welcomed the birth of three Endangered yellow-headed day geckos (*Phelsuma klemmeri*), a huge boost for the species which can only be found in the diminishing rainforests of Madagascar. This was followed in May by the birth of an infant drill (*Mandrillus leucophaeus*), one of the rarest and most threatened primates in Africa. Bristol Zoo is one of only four collections in Great Britain to have these Endangered primates. In the same month, our Mindanao bleeding heart doves (*Gallicolumba crinigera*) successfully hatched a chick, thereby adding to the captive breeding programme for this Vulnerable species.

Summer heralded further successes in our efforts to conserve Madagascan fauna. In July we celebrated the birth of our first crowned lemur, and this was followed a month later with the arrival of twin aye ayes (*Daubentonia madagascariensis*). Once thought to be extinct, the aye-aye is classified as Endangered by conservationists and experts say there may be as few as 1000 left in the wild.

We also welcomed our first tarictic hornbill (*Penelopides panini*) chick since 2002. This is the first time our new pair have bred; a great result for this Endangered Philippine species.

The end of the year was capped by the birth of four tiny Visayan warty pigs (*Sus cebifrons*). This species is Critically Endangered, under threat from habitat loss and hunting, and is only found on two of the Visayan Islands in the central Philippines.
Organized:

Neotropical primate red-listing workshop for IUCN SSC Primate Specialist Group, Houston Zoo, Texas, USA. January 2015 (C. Schwitzer, A. Cotton)


1st EAZA Terrestrial Invertebrate TAG Symposium, Artis Royal Zoo, Netherlands. August 2015. (M. Bushell)

Hosted autumn meeting of the British Veterinary Zoological Society. November 2015. (Conservation Medicine Department)


1st International Conference on the Pere David deer or Milu, Beijing, China. November 2015. (N. Maddison)

BIAZA Field Programme Committee’s 1st Biennial Conference, Bristol Zoological Society. December 2015. (N. Maddison)

Presentations:


Wattled Crane APP (African Preservation Programme) meeting, South Africa. February 2015. “Wattled Crane Health Protocols” (M. Barrows)

University Veterinary Zoological Society. February 2015. “My career as a zoo vet” (M. Barrows)

Guest speaker for a three-day theory and practical rabbit CPD course for Norwegian and Swedish vets, Centre for continuing education (SEVU), Norwegian University of Life Sciences (NMBU). February 2015.

- “Anaesthesia” (R. Saunders)
- “Dental disease” (R. Saunders)
- “Gastrointestinal tract problems” (R. Saunders)
- “Surgery” (R. Saunders)
- “Therapeutics” (R. Saunders)
- “A practical GI, dental and anatomy session” (R. Saunders)

BSAVA Congress in Birmingham, UK. April 2015.

- “Small Mammals - Fitting exotic species into general practice: equipment, procedures and pricing” (R. Saunders)
- “Introduction to small mammal surgery” (R. Saunders)
- “Sugar gliders: nutrition, husbandry and medicine” (R. Saunders)
- “Raccoons, skunks, lemurs etc basics: nutrition /husbandry /legislation” (R. Saunders)
- “Rabbits - Basic rabbit surgery” (R. Saunders)
- “Rabbit dentistry & Rabbit behavioural medicine” (R. Saunders)
- “Nurses - Small mammals - Stress free hospitalisation of the exotic” (R. Saunders)
- “What is a sugar glider and how do I nurse it” & “Meerkats - not so simples!” (R. Saunders)

BIAZA Annual General Meeting, Woburn Safari Park, UK. June 2015. “Bristol Zoo’s work with the IUCN SSC Primate Specialist Group and other SGs” (C. Schwitzer)


1st EAZA Terrestrial Invertebrate TAG Symposium, Artis Royal Zoo, Netherlands. August 2015.

- “Desertas Wolf Spider Conservation” (M. Bushell)
- “A Hope for the Crau Plains Grasshopper” (M. Bushell)
- “Gooty Ornamental Spider ESB Updates” (M. Bushell)
- “Institutional Profile of Bristol Zoo Gardens” (C. Solan)

National Crayfish Conference, Gigglewicks, Yorkshire. August 2015. “Crayfish conservation in the South West” (J. Nightingale)


International Congress for Conservation Biology, Montpellier, France. August 2015.

- “Enhancing the profile of threatened primates: Impact of ‘Top-25’ listing on the choice of species for scientific study” (D. Kerhoas, A. Webber, C. Schwitzer)
- “Integrating social science into conservation science: Examining the language of ‘human-wildlife conflict’” (D. Kerhoas, A. Webber)

XIV World Forestry Congress, Durban, South Africa. September 2015. “Competing land-use in a small island developing state: Using landscape approaches to manage sustainable outcomes in the Comoro Islands” (N. Maddison)

IUCN SSC Leaders Meeting, Abu Dhabi. September 2015.

- “Bristol Zoo’s work with the IUCN SSC Primate Specialist Group and other SGs” (C. Schwitzer)
- “Progress on the review of the Guidelines for the Management of Confiscated Animals and Plants (N. Maddison)


- “Small Gods – Dung Beetles, Poo & You” (M. Bushell)
- “Crayfish conservation in the south west” (J. Nightingale)
10th International Conference on Behaviour, Physiology and Genetics of Wildlife, Leibniz Institute for Zoo and Wildlife Research, Berlin, Germany. September 2015. “The IUCN’s One Plan Approach to integrated species conservation planning” (C. Schwitzer)


  • “Use of oral pre-medication in zoo animals” (R. Killick)
  • “Bilateral adenocarcinoma of the salivary gland in a bearded dragon” (M. Barrows)
  • “Investigation of a submandibular abscess in an okapi” (C. Day)
  • “Pouched problems: marsupials at BZS” (R. Saunders)


Belgian Group of Primatologists, Brussels, Belgium. December 2015. “IUCN SSC Primate Specialist Group – Who we are and what we do” (C. Schwitzer)

BIAZA Field Programme Committee’s 1st Biennial Conference, Bristol Zoological Society. December 2015.
  • “Mechanics of multi-zoo collaborations: building and maintaining collaborative links” (G. McCabe)
  • “A case study of a successful multi-organisation collaboration: The African penguin project” (G. McCabe)


Bristol Zoological Society Conservation Lecture Series. December 2015. “Clawing it back from the brink: The battle to save the white-clawed crayfish from extinction in England” (J. Nightingale)


Attended:

Wattled Crane APP (African Preservation Programme) meeting in South Africa February 2015. (M. Barrows)

EAZA Research Committee mid-year meeting. Antwerp Zoo, Belgium. March 2015. (C. Schwitzer)


Inaugural meeting of the British Bee Veterinary Association and became a member of the council. Bristol Veterinary School, UK. April 2015 (R. Killick)


AEECL Board meeting in Amsterdam, Netherlands. May 2015. (C. Schwitzer)


National Crayfish Conference. Giggleswick. August 2015 (J. Nightingale)

EAZA Annual Conference in Wroclaw, Poland. September 2015 (T. Skelton)

BIAZA Native Species Working Group, Sparsholt College September 2015 (M Bushell, J. Nightingale)

BIAZA Palm Oil Action Conference, ZSL London Zoo, UK. September 2015 (N. Maddison, K. Major)

Zoohistorica meeting. Stuttgart Zoo, Germany. September 2015. (C. Schwitzer)


RSPCA/APHA meeting on the welfare of wild animals used in regulated procedures. September 2015. (R. Saunders)

ABWAK (BIAZA Accredited) Reptile and Amphibian Training and Enrichment Course/Workshop. ZSL October 2015 (A. Carbin, A. Davis).

British Wildlife Rehabilitation Council’s conference, Langford. October 2015. (M. Barrows, R. Killick)

BNHC Communicate Conference, Bristol, UK. November 2015 (S. Garrett, K. Major)


Reviewing & Editing Roles:

Editors

- Animal Behavior and Cognition (Editorial Board)
- Animal Welfare (Section Editor for Zoo Animals)
- Frontiers in Veterinary Medicine: Animal Welfare and Behaviour (Review Editor)
- Journal of Zoo and Aquarium Research (Member of Editorial Board),
- Lemur News (Editor-in-Chief; Editorial Board)
- Primate Conservation Special Issue on Crowned Sifakas (Guest Editor)

Journal Review

- American Journal of Primatology
- Animal Behavior and Cognition
- Animal Welfare
- Applied Animal Behaviour Science
- Companion Animal
- International Journal of Primatology
- Journal of Heredity
- Journal Small Animal Practice
- Journal Zoo & Wildlife Medicine
- Mammalia
- Oryx
- PLoS One
- Primates
- Zoo Biology
- Zoology in the Middle East

Committee & Specialist Group Participation

- American Society of Primatologists Conservation Committee
- Association Européenne pour l'Etude et la Conservation des Lémuriens (AEECL) Executive Secretary
- BNHC Steering Group and Communicate Committees.
- BIAZA Field Programmes Committee member
- BIAZA Learning and Volunteer Committee chair
- BIAZA Native Species Working Group Steering Group
- BIAZA Primate Focus Group
- BIAZA Research Committee
- BIAZA Terrestrial Invertebrate Working Group Steering Committee
- BIAZA Veterinary Focus group with responsibility for the following: primates (R. Killick), small mammals (C. Day), birds (M. Barrows), native species (R. Saunders).
- BIAZA Volunteer Coordinators’ Forum
- Dexter Cattle Society Genetics Team
- EAZA Nutrition Group Steering Committee
- EAZA Population Management Advisory Group
• EAZA Pigeon and Dove TAG and Pink Pigeon EEP; Veterinary advisor
• EAZA Research Committee
• Howler monkey EEP – Veterinary advisor
• International Primatological Society Captive Care Committee
• International Primatological Society Vice President of Captive Care and Breeding
• IUCN Red List Facilitator (Primates)
• IUCN SSC Conservation Breeding Specialist Group
• IUCN SSC Grasshopper Specialist Group
• IUCN SSC Spider & Scorpion Specialist Group
• IUCN SSC Giraffe and Okapi Specialist Group
• IUCN SSC Primate Specialist Group Vice Chair and Red List Authority Coordinator
• IUCN SSC Stork, Ibis and Spoonbill Specialist Group
• Hubei Shishou Milu National Nature Reserve, Hubei, China, Expert Advisory Committee member
• Scientific Advisory Committee of Ambatovy Minerals S.A., Madagascar
• World Pheasant Association Scientific Advisory Committee
• Wattled Crane Recovery Programme – Veterinary advisor

Organization/Society Membership

• American Association of Physical Anthropology
• American Association of Zoo Veterinarians
• American Society of Primatologists
• British Tarantula Society
• Association of Avian Veterinarians
• Association of reptile and amphibian veterinarians
• BBSRC Animal Welfare Research Network
• British Bee Veterinary Association
• British Veterinary Zoological Society
• Chartered Institute of Ecology and Environmental Managers
• EAZA Callitrichidae Taxon Advisory Group
• European Association of Zoo and Wildlife Veterinarians
• French Society for the Study of Animal Behaviour
• International Association of Astacology
• International Primatological Society
• Phasmid Study Group
• Primate Society of Great Britain
• Society of Conservation Biology
In August 2015 over 2000 delegates from Afghanistan to Zimbabwe, and everywhere in between, converged in Montpellier, France for the 27th International Congress for Conservation Biology (jointly hosted with the European Congress for Conservation Biology). Among the participants were BZS representatives Gráinne McCabe, Amanda Webber and Daphne Kerhoas.

The conference theme, Mission Biodiversity: Choosing new paths for conservation, was a response to indications that many traditional methods for conserving biodiversity have proved unsuccessful. It emphasizes the rapid and ongoing biophysical and societal changes that are affecting the way we do science and practice conservation today, and highlights the need to keep up with and even anticipate these changes for better conservation science and practice.

Over the four days, delegates heard talks by participants from 109 different countries in 90 minute sessions examining issues as diverse as conservation genetics, conservation education and outreach, alien and invasive species, and social science and conservation. Gráinne spoke on “the efficacy of the One Plan Approach for African penguin conservation”, and Daphne and Amanda exhibited posters on “enhancing the profile of threatened primates: Impact of ‘Top-25’ listing on the choice of species for scientific study”, and “integrating social science into conservation science: Examining the language of ‘human-wildlife conflict’”.

This high level of participation in one of the world’s premier conservation conferences highlights the high quality and relevancy of research undertaken by the Bristol Zoological Society.
Mohamed bin Zayed Species Conservation Fund, Abu Dhabi: US$12,000 (£8272) for population assessment of the Sanje mangabey, Cercocebus saniei, in the Udzungwa Mountains, Tanzania

Mohamed bin Zayed Species Conservation Fund, Abu Dhabi: US$4900 (£3378) for MSc (University of Bristol) student Daniel Hending on behavioural ecology and bioacoustics of the Sambirano mouse lemur (Microcebus sambiranensis)

Mohamed bin Zayed Endangered Species Fund, Abu Dhabi: US$4000 (£2757) for MSc (University of Bristol) student Jennifer Grigg on the foraging success in African penguins


Riverbanks Zoo Conservation Grant, USA: US$4740 (£3268) for MSc (University of Bristol) student Jennifer Grigg on the foraging success in African penguins

The British Chelonia Group, UK: £3000. The genetics of the African pancake tortoise.


AEECL Conservation Grant, France: €1000 (£792) for MSc (University of Bristol) student Daniel Hending on behavioural ecology and bioacoustics of the Sambirano mouse lemur (Microcebus sambiranensis)

AEECL Conservation Grant, France: €1000 (£792) for Caitlin Eschmann (PhD student, University of Bristol) on reproductive isolation mechanisms and possible hybridization between blue-eyed black (Eulemur flavifrons) and black (Eulemur macaco) lemurs in northwest Madagascar
Leipzig Zoo, Germany: €2500 (£1775) for African Penguin Chick Bolstering Project.

American Society of Mammalogists, USA: US$1,500 (£1034) Grant-in-Aid of Research for Caitlin Eschmann (PhD student, University of Bristol) on reproductive isolation mechanisms and possible hybridization between blue-eyed black (*Eulemur flavifrons*) and black (*Eulemur macaco*) lemurs in northwest Madagascar.

Primate Society of Great Britain Conservation Grant, UK: £818 for Isabella Mendl (PhD student, University of Bristol) on the social structure of the Sahamalaza sportive lemur (*Lepilemur sahamalazensis*).

The Sidney Perry Foundation Trust, UK: £800 for Caitlin Eschmann (PhD student, University of Bristol) on reproductive isolation mechanisms and possible hybridization between blue-eyed black (*Eulemur flavifrons*) and black (*Eulemur macaco*) lemurs in northwest Madagascar.

Basel Zoo: CHF1075 (£716) for the African Penguin Chick Bolstering Project.

Christain Vogel Fond, Germany: €800 (£634) for Caitlin Eschmann (PhD student, University of Bristol) on reproductive isolation mechanisms and possible hybridization between blue-eyed black (*Eulemur flavifrons*) and black (*Eulemur macaco*) lemurs in northwest Madagascar.


